



Australian Government

Department of Defence
Science and Technology



DEFENCE INDUSTRY &
INNOVATION
NEXT GENERATION
TECHNOLOGIES FUND

EDTAS

EMERGING DISRUPTIVE TECHNOLOGY
ASSESSMENT SYMPOSIUM

SPEAKERS

dst.defence.gov.au/edtas

 #EDTAS



SPEAKERS



DR ALEX ZELINSKY **CHIEF DEFENCE SCIENTIST**

Dr Alex Zelinsky is Australia's Chief Defence Scientist. His scientific career includes working as a computer scientist, a systems engineer and a roboticist. His career spans innovation, science and technology, research and development, commercial start-ups and education. As Chief Defence Scientist since March 2012, he leads the Defence Science and Technology program within the Department of Defence.

Prior to joining Defence, Dr Zelinsky was Group Executive for Information Sciences at the CSIRO. Dr Zelinsky was Chief Executive Officer and co-founder of Seeing Machines, a high-technology company developing computer vision systems. The company is listed on the London Stock Exchange and was a start-up from the Australian National University in Canberra, Australia, where Dr Zelinsky was Professor of Systems Engineering.

Dr Zelinsky has received numerous awards and recognition of his work. In 2017, he was appointed an Officer in the Order of Australia (AO) in the 2017 Queen's Birthday honours. He has been included in Engineers Australia's list of the 100 most influential engineers since 2009 and in 2015, Engineers Australia awarded him the prestigious M A Sargent Medal. In 2013,

he was awarded the Pearcey Medal, the ICT industry's premier prize for lifetime achievement. In 2003, 2004 and 2005, the World Economic Forum selected Dr Zelinsky as a Technology Pioneer. He is a Fellow of the Institute of Electrical and Electronics Engineers, the Australian Academy of Technology and Engineering, the Institute of Engineers Australia and the Australian Institute of Company Directors.



PROF PETER RATHJEN **VICE CHANCELLOR, UNIVERSITY OF ADELAIDE**

Professor Peter Rathjen commenced as the University of Adelaide's 22nd Vice-Chancellor and President on 8 January 2018.

He is an Australian scientist and medical researcher internationally recognised in stem cell science.

Professor Rathjen is an alumnus of the University of Adelaide, as are all of the members of his immediate family

Professor Rathjen was appointed Dean of the Faculty of Science at the University of Melbourne in 2006; in 2008, he became Dean of the Graduate School of Science, and from 2008 to 2011 he served as Deputy Vice-Chancellor (Research). In 2011, he took up the role of Vice-Chancellor of the University of Tasmania, a role he held until October 2017.



BRIGADIER CRAIG SCHRAMM

Brigadier Craig Schramm was born in Brisbane where he completed his secondary schooling

and tertiary education in medicine. He joined the Army in August 1989 as an undergraduate Medical Officer allocated to the Royal Australian Army Medical Corps.

During his military career, Craig has held a number of postings, particularly in Aviation Medicine. He also spent 3 years as the Director of Future Health Capability for the ADF and spent a number of years as Specialist Medical Adviser – Airworthiness for the Australian Army. He has deployed on a number of occasions, including to Rwanda, East Timor, Banda Aceh, and Afghanistan. He completed Army pilot training in 2004.

Craig is a graduate of the University of Queensland, Kings College London, Edith Cowan University and the Southern California Safety Institute, and holds post-graduate qualifications in Aviation Medicine, Occupational Medicine, Workplace Health and Safety and Aircraft Accident Investigation. He holds Fellowships of the Australasian College of Aerospace Medicine, the Royal Aeronautical Society, the Australasian College of Tropical Medicine, and the Faculty of Travel Medicine, Associate Fellowship of the Aerospace Medical Association, and is a Member of the International Academy of Aviation and Space Medicine. He is the Immediate Past President of the Australasian College of Aerospace Medicine.



DR MARK CORBETT UNIVERSITY OF ADELAIDE

Dr Corbett's primary research aim is to map the genetic landscape

of neurological disorders, with a view to understanding the basic biology of cognition and to provide an in-road for therapies for these devastating disorders. He has built his career in human genetics by implicating a host of new genes in intellectual disability, epilepsy and other neurodevelopmental disorders. These individually rare but collectively common disorders affect about 3% of the population and have a huge social, financial and welfare burden on those affected.



PROF CHRIS LOWRY

Christopher A. Lowry, Ph.D., is an Associate Professor in the Department of Integrative Physiology and Centre for Neuroscience

at the University of Colorado Boulder, with a secondary appointment in the Department of Physical Medicine and Rehabilitation (PM&R) and Centre for Neuroscience at the University of Colorado Anschutz Medical Campus (AMC), a Principal Investigator in the Department of Veterans Affairs Eastern Colorado Health Care System, VA Rocky Mountain Mental Illness Research, Education, & Clinical Centre (MIRECC), and director of the Behavioural Neuroendocrinology Laboratory at CU Boulder. He is Co-Director, with Dr. Lisa Brenner, of the Military and Veteran Microbiome Consortium for Research and Education (MVM-CoRE).

Dr. Lowry's research program focuses on understanding stress-related physiology and behaviour with an emphasis on the role of the microbiome-gut-brain axis in stress resilience, health and disease.



PROF MARK HUTCHINSON

Professor Hutchinson is the Director of the ARC Centre of Excellence for Nanoscale BioPhotonics

(CNBP) and a Professor within the School of Medicine at the University of Adelaide.

Professor Hutchinson's research explores the "other brain" or the other 90% of cells in the brain and spinal cord. These immune-like cells are termed glia. Mark's research has implicated the brain immune-like cells in the action of drugs of dependence and the negative side effects of pain treatments. He has pioneered research which has led to the discovery of novel drug activity at innate immune receptors. His work has enabled the translation of compounds at the lab bench to clinical agents used at the bedside.

He has now added Director of the CNBP to his roles. Prof Hutchinson's work with the CNBP is to "Discover new approaches to measure nano-scale dynamic phenomena in living systems" and allow the first minimally invasive realtime visualisations of the "other brain".



DR JOHAN VERJANS

Dr John Verjans is a senior lecturer at the University of Adelaide, with research interests

in clinical innovation and E-Health.

He gained his PhD from Maastricht University in 2011, having completed his MD at the same institution in 2007.

His current research interests include:

Pre-clinical

- Non-invasive (Molecular) Imaging of Atherosclerosis, Myocardial infarction, Heart Failure (PET/SPECT, Optical, MRI, CT)
- Intravascular Imaging of Atherosclerosis (OCT, Hybrid Fluorescence/OCT Catheters)

Clinical (CT, MR)

- Non-invasive imaging of atherosclerotic disease (CT, MRI)
- Non-invasive imaging of interstitial changes after myocardial infarction (SPECT/PET, MRI)
- Population Imaging / Machine learning in Cardiovascular Disease



DR ASHLEY CONNOLLY

FLINDERS UNIVERSITY

Dr Connolly graduated from the University of Adelaide with honours

degree in chemistry and a PhD in immunology. He maintained a focus on interdisciplinary research through appointments in the United Kingdom (Oxford & Manchester) and Australia (ANU & UQ) and is currently a research scientist in the Centre for Nanoscale Science & Technology at Flinders University. His research is focussed on developing novel DNA nanotechnologies for rapid disease diagnosis. This research is documented in 18 publications and a book chapter



DR ESMAEL EBRAHIMIE

UNIVERSITY OF
ADELAIDE

Dr. Esmail Ebrahimie
is a high-achieving

Bioinformatician at The University of Adelaide who has been innovative in applying new data mining algorithms for integrative analysis of large datasets, particularly from NGS (next generation sequencing). Knowledge discovery and sequence-based prediction of pandemic influenza and developing novel approach for identification of influenza virus host range and zoonotic transmissible sequences are examples of his research in application of machine learning algorithms infection diseases. Due to the advance in microbiome sequencing technique and outstanding features of metagenomics profiling, he collaborates in unravelling microbiome biosignature of various diseases as well as profiling the effects of new antibiotic compounds, such as the third-generation veterinary fluoroquinolone, on microbiomes. Microbiome based classification of antibiotics and antimicrobial alternatives and developing an expert system for prediction of the effective antimicrobials based on microbiome profile is of his research interests. Dr Ebrahimie has 88 journal publications in the past 5 years (since 2013), focusing on computational systems biology and biostatistics. He serves on the editorial boards of several well-known journals, such as Plos One, Electronic Journal of Biotechnology, and Computational and Mathematical Methods in Medicine.



PROF EWA GOLDYS

Professor Ewa M. Goldys
is Deputy Director of the
Australian Research Council
Centre of Excellence in
Nanoscale Biophotonics

(cnbp.org.au) and Professor at the Graduate School of Biomedical Engineering, the University of New South Wales, Sydney, Australia. She is Fellow of the Australian Academy of Technological Science and Engineering (ATSE), Society for Optics and Photonics (SPIE), the Optical Society and winner of the 2016 Australian Museum Eureka Prize for 'Innovative Use of Technology'.

Her research spans the interface of ultrasensitive optical characterization, biotechnology, materials science and photonics. A portfolio of her works is centred on the development and understanding of luminescence emission in doped nanocrystals where she developed advanced methods of synthesis and characterisation of fluorescent nanoparticles for applications in fluorescence labelling. Her expertise in ultrasensitive optical characterisation and nanotechnology led to the development of novel approaches to biochemical and medical sensing and diagnostics. Current projects focus on label-free non-invasive high content cellular imaging and characterisation of cell subpopulations, on nanoparticle chemical sensors and theranostics.



DR LAURA WEYRICH
UNIVERSITY OF ADELAIDE

Dr. Weyrich received a PhD in Microbiology and Bioethics from Penn State, studying how respiratory infections alter the microbiome. In 2012, she moved to the University of Adelaide and established a research team at The Australian Centre for Ancient DNA that uses calcified dental plaque to reconstruct ancient human oral microbiomes. Her team was the first to reconstruct the microbiome of an extinct species - Neandertals - and has reassembled the oldest microbial genome to date at 48,000 years old. Her team's research has been featured by the BBC, NPR, Science, Nature, New Scientist, NY Times, Smithsonian Magazine, National Geographic, and many others, and has even had a Buzz Feed quiz written about it. Her team is now reconstructing the evolutionary history of the human oral microbiome on six continents, obtaining insight into how the lifestyles and diets of our ancestors impact our health today.



PROF PAUL THOMAS
UNIVERSITY OF ADELAIDE

Prof Paul Thomas is a biomedical researcher and Director of the SA Genome Editing Facility at the University of Adelaide and South Australian Health and Medical Research Institute. Prof Thomas completed his Ph.D. at the University of Adelaide in 1994. He then moved to the National Institute for Medical

Research (London) and completed a 3-year post-doctoral position with the late Dr. Rosa Beddington, who was a world-leader in the field of developmental biology. In 1998, he returned to Australia with the support of a NHMRC Florey Fellowship and established an independent research group at the Murdoch Institute in Melbourne. In 2006, he moved to the University of Adelaide and in 2008 was awarded a prestigious Pfizer Australia Research Fellowship. In 2014 he was promoted to full Professor and established the SA Genome Editing (SAGE) facility. In 2018, he relocated to the South Australian Health and Medical Research Institute where he directs the Developmental Genetics laboratory and SAGE facility.

His research focuses on the genetics of brain development in mice and humans and in recent years has developed considerable expertise in generation of mouse models using CRISPR/CAS9 genome editing system. He has published more than 80 scientific articles. His research is supported by the USA Defense Advanced Research Projects Agency (DARPA) and the Australian National Health & Medical Research Council.



PROF ANNA MA-WYATT
UNIVERSITY OF ADELAIDE

A/Prof Anna Ma-Wyatt holds a BA (Hons) from the University of Sydney and a PhD from Macquarie University. She was a postdoctoral research fellow at the University of Western Australia, and then was awarded a Rachel C. Atkinson Fellowship at the Smith-Kettlewell Eye

Research Institute in San Francisco, USA. She then returned to Australia to take up an appointment at the University of Adelaide, where she is currently an Associate Professor in the School of Psychology.

A/Prof Ma-Wyatt is an international expert in human vision, eye movements and hand movements. Part of her current work is funded by the US Department of Defense in collaboration with DST to work on the assessment of human machine interfaces (HMIs) for control of autonomous vehicles. She is also working with BAE Systems on assessment of the human machine interface for JORN.



**PROF PAUL
STODDART**
**SWINBURNE
UNIVERSITY**

Paul Stoddart graduated with BSc (Honours) in physics and PhD in laser spectroscopy from the University of the Witwatersrand, South Africa. After working on industry-focused surface science and microanalysis problems in a national lab for three years, he joined Swinburne University of Technology in 2001. He is currently the Director of Swinburne's ARC Training Centre in Biodevices, which received the Vice-Chancellor's Engagement Award in 2014 and Vice-Chancellor's Award for Research Excellence in 2017. As a Professor of Biomedical Engineering at Swinburne, his research interests include applied optics, biophotonics and medical devices, with a particular focus in the areas of optical nerve stimulation and optical fiber biosensors based on Raman spectroscopy.



PROF GARY EGAN

Gary Egan is a Distinguished Professor and Foundation Director of the Monash Biomedical Imaging (MBI) research

facilities at Monash University, and Director of the Australian Research Council Centre of Excellence for Integrative Brain Function. The Centre's research focus is to understand the link between brain activity and human behaviour by integrating research across Australia's leading brain researchers in the fields of anatomy, physiology, neuroimaging, informatics, neural modelling and neuroengineering. For the past two decades he has been one of Australia's pioneering and internationally recognised neuroimaging and neuroscience researchers, using PET and MRI in human and animal model neuroscience research, as well as establishing the emerging field of neuroinformatics in Australia.



**DR ELIZABETH
PHARO**
CSIRO

Elizabeth Pharo completed her PhD in 2016 in Professor Marilyn Renfree's

laboratory in the School of Biosciences at The University of Melbourne. During her PhD, she studied the endocrine and transcriptional regulation of milk protein genes in an Australian marsupial, the tammar wallaby (*Macropus eugenii*) using mammary gland explants, primary mammary epithelial cells, immortalised cell lines and comparative genomics. In 2017, she commenced a Postdoctoral Fellowship at CSIRO Australian Animal Health

Laboratory, Geelong working on developing ex vivo organoid models with which to investigate respiratory and vascular viruses (Influenza, MERS, SARS, Ebola, etc.).



PROF MICHAEL PARKER

Professor Michael Parker is Director of the Bio21 Institute, University of Melbourne and Head of

Structural Biology, St. Vincent's Institute of Medical Research in Melbourne. He is also an NHMRC Senior Principal Research Fellow in the Department of Biochemistry and Molecular Biology at Bio21.

After obtaining his D. Phil. in protein crystallography from Oxford University, Michael returned to Australia to re-establish a protein crystallography laboratory at St. Vincent's in 1991.

He has published over 300 papers and his work has been recognised with numerous awards

He was elected a Fellow of the Australian Academy of Science in 2010 and a Fellow of the Australian Academy of Health and Medical Sciences in 2015. He is currently Chair of the National Committee of Crystallography under the auspices of the Australian Academy of Science.



PROF ROBERT MCLAUGHLIN

UNIVERSITY OF ADELAIDE

Robert McLaughlin is head of the Bioengineering

Imaging Group at The University Adelaide. He currently leads a research

team developing highly miniaturised imaging probes, small enough to be encased within hypodermic needles.

After three years as a researcher at the University of Oxford, he spent five years in the medical imaging industry, including as a Product Manager with Siemens Medical Solutions. He was responsible for the development of three medical devices, two with FDA regulatory approval.

Returning to academia in 2007, he focused on the development of optical imaging technologies, particularly optical coherence tomography and fluorescence. He has been awarded over \$5M in research grants.

In 2014, Robert was appointed as a Councillor of the Australian Optical Society. In 2016, he was appointed Chair of Biophotonics at the University of Adelaide.

NOTES







dst.defence.gov.au/edtas

 #EDTAS